

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

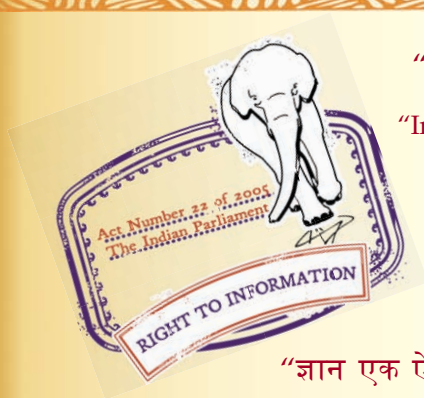
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

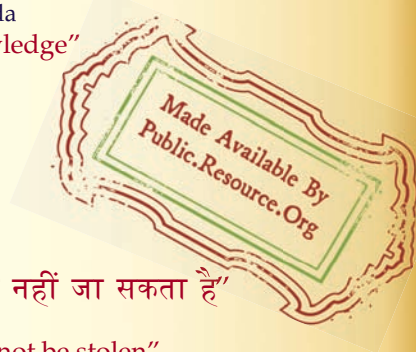
IS 3964 (1980): Light rails - [CED 7: Structural Engineering and structural sections]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



IS : 3964 - 1980

Indian Standard
SPECIFICATION FOR LIGHT RAILS
(*First Revision*)

UDC 669.14 - 424



© Copyright 1980

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Rs 5-00

Gr 3

August 1980

Indian Standard

SPECIFICATION FOR LIGHT RAILS

(*First Revision*)

Structural Sections Sectional Committee, SMDC 6

Chairman

SHRI M. DHAR

Members

SHRI S. BANERJEE

SHRI N. BHATTACHARYA

SHRI N. S. CHATTREE

SHRI V. MUKUNDAN (*Alternate*)

SHRI B. B. CHAKRAVERTI

SHRI A. K. SHOME (*Alternate*)

SHRI D. S. DESAI

SHRI D. GADH

SHRI S. K. MAHAPATRA (*Alternate*)

SHRI S. B. GUPTA

SHRI P. C. MUSTAFI (*Alternate*)

SHRI M. P. JASUJA

Representing

Kamani Engineering Corporation Ltd, Bombay

Steel Re-Rolling Mills Association of India,
Calcutta

Garden Reach Shipbuilder and Engineers Ltd,
Calcutta

Steel Authority of India Ltd, Bhilai Steel Plant,
Bhilai

Superintendence Co of India (Pvt) Ltd, Calcutta

M. N. Dastur & Co Pvt Ltd, Calcutta

The Tata Iron and Steel Co Ltd, Jamshedpur

Inspection Wing, Directorate General of Supplies
and Disposals, New Delhi

Steel Authority of India Ltd, Research and
Development Centre for Iron and Steel,
Ranchi

JOINT DIRECTOR STANDARDS (WAGON I), RDSO
Ministry of Railways

JOINT DIRECTOR STANDARDS
(B&S), RDSO (*Alternate*)

SHRI OM KHOSLA

EMC Projects Pvt Ltd, Calcutta

SHRI S. N. SINGH (*Alternate*)

SHRI P. LAXMINARAYANA

Hindustan Shipyard Ltd, Vishakhapatnam

SHRI V. A. S. NARAYANA RAO (*Alternate*)

SHRI S. K. MITRA

Indian Iron & Steel Co Ltd, Burnpur

SHRI S. DUTTA (*Alternate*)

SHRI P. K. MUKHERJEE

The Braithwaite and Co Ltd, Calcutta

SHRI AMIT KUMAR BHATTACHARYA (*Alternate*)

(*Continued on page 2*)

© Copyright 1980

INDIAN STANDARDS INSTITUTION

This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(Continued from page 1)

<i>Members</i>	<i>Representing</i>
SHRI M. V. NAGESHAIAH	Metallurgical & Engineering Consultants (India) Ltd, Ranchi
SHRI KAMMAL PRAKASH (<i>Alternate</i>)	
SHRI D. B. NAIK	Engineer-in-Chief's Branch, Army Headquarters, New Delhi
MAJ G. S. SONDH (<i>Alternate</i>)	
SHRI P. V. NAIK	Richardson and Cruddas Ltd, Bombay
BRIG L. V. RAMAKRISHNA	Institution of Engineers (India), Calcutta
SHRI P. S. RANGAVITTALAN	Iron & Steel Control, Calcutta
SHRI S. ROY	Steel Authority of India Ltd, Bokaro Steel Plant, Bokaro
SHRI K. V. RAO (<i>Alternate</i>)	
SHRI SUBRATA ROY	Steel Authority of India Ltd, Rourkela Steel Plant, Rourkela
SHRI V. P. AGARWAL (<i>Alternate</i>)	
SHRI S. K. SADHU	Jessop & Co Ltd, Calcutta
SHRI S. C. CHAKRABARTI (<i>Alternate</i>)	
SHRI M. C. SARANGDHAR	Stup Consultants Ltd, Bombay
SHRI M. K. CHATTERJEE (<i>Alternate</i>)	
SHRI D. SRINIVASAN	Joint Plant Committee, Calcutta
SHRI B. P. GHOSH (<i>Alternate</i>)	
SHRI K. S. SRINIVASAN	National Buildings Organization, New Delhi
SHRI A. K. LAL (<i>Alternate</i>)	
SHRI K. SURYANARAYANAN	Indian Aluminium Co Ltd, Calcutta
SHRI R. K. MEHTA (<i>Alternate</i>)	
SHRI D. THIRUVENGADAM	Tube Investments of India Ltd, Madras
SHRI M. SANKARAN (<i>Alternate</i>)	
SHRI C. R. RAMA RAO, Director (Struc & Met)	Director General, ISI (<i>Ex-officio Member</i>)
<i>Secretary</i>	
SHRI M. S. NAGARAJ	
Deputy Director (Struc & Met), ISI	

Panel for Crane Rail Sections, SMDC 6 : P4

<i>Convener</i>	
SHRI D. GADH	The Tata Iron & Steel Co Ltd, Jamshedpur
<i>Members</i>	
SHRI J. L. AGGARWAL	Cranes and Allied Appliances Sectional Com- mittee, SMDC 26, ISI
SHRI P. G. BARDHAN	Braithwaite & Co Ltd, Calcutta
SHRI A. K. BANERJEE CHOUDHURY	Cranes and Allied Appliances Sectional Com- mittee, SMDC 26
SHRI D. S. DESAI	M. N. Dastur & Co Pvt Ltd, Calcutta

(Continued on page 10)

Indian Standard
SPECIFICATION FOR LIGHT RAILS
(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 30 May 1980, after the draft finalized by the Structural Sections Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Light rails are being manufactured practically by all the major steel plants. Light rails are mostly used in collieries, mines and quarries; sugar, paper, jute and textile mills; salt and cement works; tea and other plantations; irrigation projects; and farms and forestries. The Sectional Committee considered that a standard specification for these rails would assist in the manufacture and procurement of the material.

0.3 This standard was first published in 1967. In this revision the following modifications have been effected:

- a) 25 kg/m rail section has been added to cater to the needs of the mining industry,
- b) Chemical composition requirements have been added, and
- c) Sectional properties have been added.

0.4 In the preparation of this standard, assistance has been derived from the following documents:

BS : 536-1934 Specification for light flat bottom railway rails and fishplates. British Standards Institution.

IRS T12-64 Flat Bottom railway rails. Ministry of Railways, Government of India.

IRS T18-69 Second quality flat bottom railway rails. Ministry of Railways, Government of India.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers requirements for light rails sections.

2. GENERAL REQUIREMENTS FOR THE SUPPLY OF MATERIAL

2.1 General requirements relating to supply of material shall be as laid down in IS : 1387-1967†.

3. DESIGNATION

3.1 Light rail sections conforming to this standard shall be designated by the letters ISLR followed by a figure which denotes mass in kilograms per metre of the rail section.

3.2 For shop marking and drawing office purposes, abbreviated reference symbol LR instead of ISLR may be permitted provided specific understanding exists between the producer, drawing office and fabricator.

4. CHEMICAL COMPOSITION

4.1 The material, when analyzed in accordance with IS : 228-1959‡ and its relevant parts, shall have the following chemical composition in the finished product:

<i>Designation according to</i> IS:1762 (Part I)-1974§		<i>Percent</i>				
		<i>C</i>	<i>Mn</i>	<i>Si</i>	<i>S</i>	<i>P</i>
New	Old					
50 C12 (C50 Mn12)		0.40-0.60	0.90-1.45	0.07-0.30	0.060	0.060

*Rules for rounding off numerical values (*revised*).

†General requirements for the supply of metallurgical materials (*first revision*).

‡Methods of chemical analysis of pig iron, cast iron and plain carbon low alloy steels (*revised*).

§Code of designation of steels : Part I Based on letter symbols (*first revision*).

5. TENSILE PROPERTIES

5.1 The tensile test specimen shall be located as shown in Fig. 1 when tested in accordance with IS : 1608-1972*. The steel shall have a minimum tensile strength of 710 MPa (72 kgf/mm²) with a minimum elongation of 14 percent on a gauge length of $5.65 \sqrt{S_0}$ where S_0 is the area of cross section of the specimen in the gauge length.

6. DIMENSIONS AND SECTIONAL PROPERTIES

6.1 Dimensions — Dimensions of light rail sections shall be as given in Table 1. Sectional properties are given in Table 2.

6.2 Tolerances — The tolerances on various dimensions of light rail sections shall be as follows:

<i>Dimensions</i>	<i>Tolerance</i> mm
Head width (B)	± 2.0
Web thickness (C)	+ 1.0 - 0.5
Height (A)	± 1.0
Bottom flange width (E)	± 2.0
Length of rail	± 50
Mass per metre	± 3 percent

7. FREEDOM FROM DEFECTS

7.1 The rails should be reasonably free from twist, camber and other harmful defects.

8. MARKING

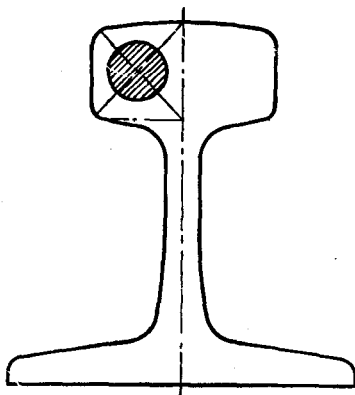
8.1 Light rail sections shall be marked with the following details:

- Manufacturer's identification mark, and
- Designation (*see* 3.1 and Table 1).

8.1.1 The material may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

*Method for tensile testing of steel products (*first revision*).

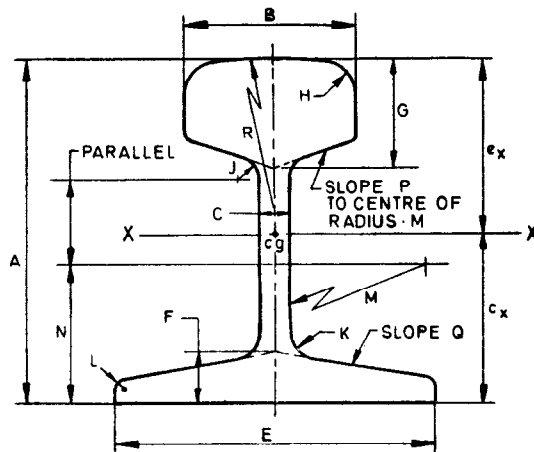


**FIG. 1 LOCATION OF SAMPLE FOR CHEMICAL ANALYSIS
AND TENSILE TESTING**

TABLE 1 DIMENSIONS OF LIGHT RAILS

(Clause 6.1)

All dimensions in millimetres.



DESIGNATION	SECTIONAL AREA	MASS	DIMENSIONS												SLOPE		R
			A	B	C	E	F	G	H	J	K	L	M	N	P	Q	
(1)	(2) cm ²	(3) kg/m	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
ISLR 10	12.74	10.0	63.50	34.93	5.95	63.50	10.32	19.45	6.35	4.76	4.76	1.59	Parallel	Web	1 in 5	1 in 5	304.8
ISLR 12	15.24	12.0	69.85	35.72	6.75	60.00	12.11	22.23	6.35	6.35	6.35	2.51	Parallel	Web	1 in 5	1 in 5	152.4
ISLR 15	18.98	14.9	79.38	41.28	7.54	76.20	11.91	25.40	7.94	4.76	6.35	1.59	190.50	32.94	1 in 3	1 in 6	228.6
ISLR 25	31.68	24.9	104.78	52.39	9.92	100.01	15.08	32.94	9.53	5.56	8.73	3.97	228.60	43.66	1 in 3	1 in 6	228.6

As in the Original Standard, this Page is Intentionally Left Blank

TABLE 2 SECTIONAL PROPERTIES OF LIGHT RAILS

(Clause 6.1)

DESIGNA- TION	MASS	SECTIONAL AREA	POSITION OF CENTRE OF GRAVITY		MOMENT OF INERTIA	SECTIONS MODULUS	
			e_x	e_y		$Z_{x1} = I_x/e_x$	$Z_{x2} = I_x/e_y$
	kg/m	cm ²	cm	cm	cm ⁴	cm ³	cm ³
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ISLR 10	10	12.74	3.14	3.21	70.23	22.35	21.89
ISLR 12	12.0	15.24	3.69	3.30	97.26	26.36	29.52
ISLR 15	14.9	18.98	4.06	3.87	162.33	39.94	41.91
ISLR 25	24.9	31.68	5.36	5.12	476.17	89.52	93.02

IS : 3964 - 1980

(Continued from page 2)

Members

SHRI S. R. JAISWAL

SHRI T. P. BULANI (*Alternate*)

SHRI K. K. MANGAL

SHRI P. VISWAKARMA (*Alternate*)

SHRI B. P. MAITI

SHRI S. K. MITRA

SHRI R. N. SINHA

Representing

Steel Authority of India Ltd, Rourkela Steel
Plant, Rourkela

Tata Iron & Steel Co Ltd, Jamshedpur

Metallurgical and Engineering Consultants
(India) Ltd, Ranchi

Indian Iron & Steel Co Ltd, Burnpur

Cranes and Allied Appliances Sectional Com-
mittee, SMDC 26, ISI

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	Unit	Symbol
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	Unit	Symbol	Definition
Force	newton	N	1 N = 1 kg. m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 26 60 21, 27 01 31

Telegrams : Manaksanstha

Regional Offices:

	Telephone
Western : Novelty Chambers, Grant Road	BOMBAY 400007 37 97 29
Eastern : 5 Chowringhee Approach	CALCUTTA 7 00072 27 50 90
Southern : C. I. T. Campus, Adyar	MADRAS 600020 41 24 42

Branch Offices:

Pushpak', Nurmohamed Shalkh Marg, Khanpur	AHMADABAD 380001 2 03 91
'F' Block, Unity Bldg, Narasimharaja Square	BANGALORE 560002 2 76 49
Gangotri Complex, Bhadbhada Road, T. T. Nagar	BHOPAL 462003 6 27 16
22E Kalpana Area	BHUBANESHWAR 751014 5 36 27
Ahimsa Bldg, SCO 82-83, Sector 17C	CHANDIGARH 160017 2 83 20
5-8-56C L. N. Gupta Marg	HYDERABAD 500001 22 10 83
D-277 Todarmal Marg, Banipark	JAIPUR 302006 6 98 32
117/418 B Sarvodaya Nagar	KANPUR 208005 8 12 72
Patliputra Industrial Estate	PATNA 800013 6 28 08
Hantex Bldg (2nd Floor), Rly Station Road	TRIVANDRUM 695001 32 27